# Educational Value of Human-Animal Interactions

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**Abstract**

Human-animal interactions are inherently multi-disciplinary. However, the influence of human-animal interactions on academic achievement has yet to be evaluated in the literature. Although it has been suggested that animals influence the development of human intelligence (Shepard, 1978), this theory has not been thoroughly tested. The objective of the present study was to evaluate the educational value of human-animal interactions by measuring the effect of a live animal present in a student learning environment. It is hypothesized that the presence of a live animal during a presentation will increase a student's knowledge about that animal. Sixty-seven college students were randomly assigned to one of three presentation formats: live presentation with a live animal present, recorded presentation with a live animal present, or recorded presentation with no live animal present. A pre-/post-test was used to measure the knowledge gained during the presentation. Results suggest that the presence of a live animal, as well as a live presenter, in a learning situation yields higher average post-test scores. The student's area of study, identified through a demographics survey, served as a mediator of pre-existing knowledge as measured by the pre-test. Initial means comparison using SPSS indicate that the presence of a live animal yields a 41% increase in knowledge gain as measured by average post-test scores. There were no differences in the average post-test scores of the three groups due to the presentation format. Both groups with a live animal present showed a 27% increase in post-test scores compared to the pre-test scores while the group that did not include a live animal present during the presentation only demonstrated a 16% increase in knowledge gained. These results support the hypothesis that human-animal interactions in an educational setting improves student learning.

## Introduction

Human-animal interactions have been the focus of scientific study for many decades. It is well documented that human-animal interactions can be beneficial in multiple ways to both species (Davis and Balfour, 1992; Rowan and Beck, 1994; McCardle et al., 2008).
An example is the bond that human and animal subjects develop in a research setting (Davis and Balfour, 1992). Whatever the qualities of this relationship, an increasing body of evidence suggests that it may result in significant behavioral and physiological changes in the animal subject, as well as the human researcher, ranging from biomedical (e.g., heart rate, blood pressure, and immunological changes) to animal sciences (e.g., growth and production) (Davis and Balfour, 1992).

Additionally, in a medical setting, human-animal interactions are extremely useful in cases of stress, anxiety, and depression (McCardle et al., 2008). Those who own a pet have a reduced risk for cardiovascular disease (Rowan and Beck, 1994). Pet owners also have lower systolic blood pressures, plasma cholesterol, and triglyceride values (Rowan and Beck, 1994). There is strong evidence that human-animal interactions help children develop stronger immune systems if in contact at an early age (McCardle et al., 2008; Robinson, 2013).

It has also been found that positive human-animal interactions reduce stress levels and create a better atmosphere for production animals. This, in return, produces a better quality product for the industry (Hemsworth et al. 1987; Hemsworth, 2003). In the dairy industry, it was found that the use of negative interactions by handlers were significantly and negatively correlated with milk yield, protein, and fat content. The significance in this study indicated the

possibility of targeting specific human characteristics to reduce fear responses of dairy cows to humans and improve the cows' productivity (Hemsworth et al., 2000).

Although much research has been conducted on many facets of the human-animal relationship, research has yet to focus on these interactions in the context of academic achievement. Although many scholars anecdotally proclaim that animals are the necessary scaffold for the development of human intelligence (Shepard, 1978), the scientific community has yet to thoroughly test this theory (Esposito et al., 2011; McCardle et al., 2008; Serpell, 2006). The objective of this study was to test the effect of the presence of a live animal in a student learning environment. It is hypothesized that the presence of a live animal during a presentation will increase a student's knowledge about that animal.

**Materials and Methods**

For this study, 67 college students were randomly assigned into three groups: recorded presentation with no live animal present (control), live presentation with live animal present, and recorded presentation with live animal present. Half of the participants were asked to complete the knowledge pre-test. This test included questions about specific animals, their life strategies, their reproductive techniques, and more.

For the live presentation with a live animal present, a representative of the Columbus Zoo and Aquarium gave a presentation that included information regarding animal physiology, reproduction, social structure, diet/nutrition, and terminology for each species presented. The animals presented to the participants were the cheetah and the black-footed penguin. The live presentation was recorded for use in the remaining two groups of participants. Following the presentation, a knowledge posttest was given to all participants.

The project design was between subjects pre-/posttest. The sample population consisted of adult college students from The Ohio State University. Students of all disciplines were eligible. The independent variable of interest in this study was the presence of a live animal. Three treatments were used: live presentation with live animal present and recorded presentation with live animal present. Additionally a recorded presentation with no live animal present was used as a control group. The dependent variable of interest was overall level of knowledge gained.

The researchers controlled for environment by holding the study in the same room on the same evening for each group of participants. Also controlled is the speaker preference by having the same speaker (live and recorded) present the information. The pre-/posttest experimental design is an accepted practice to measure change in knowledge. Internal validity is also increased by the use of random selection and a control group. Data was recorded and statistically analyzed using SPSS statistical software.

**Results**

The student population consisted of 67% animal-related majors versus 33% non-animal related majors (Table 1). Demographic correlations determined that discipline, as well as an agricultural background, had a slight positive correlation with pre-existing knowledge (Table 2). Demographics such as cohabitation, zoo experience, and gender were found to have little or no correlation with pre-existing knowledge.

The average pre-test and post-test scores were then measured between all three treatment groups. Treatment A group (live animal, live presentation) had a pre-test average of 47% and a posttest average of 74%. Treatment B group (live animal, recorded presentation) had a pre-test

average of 44% and a posttest average of 71%. Finally, the control group (no animal, recorded presentation) had a pre-test average of 57% and a post-test average of 73% (Figure 1). The differences between each treatment groups' percentages represented the average knowledge gain of the student participants.

Test scores were combined and measured between animal-related majors and non-animal related majors (Table 3). Non-animal related majors who took the pre-test (n=11) had a mean score of 41% ± 0.1084 ( p = 0.026). Animal-related majors who took the pre-test (n=23) had a mean score of 52% ± 0.1404 (p = 0.017). Posttest scores averaged 69% ± 0.1189 (p = 0.1189) for students with non-animal related majors (n=22). Students with animal-related majors (n=43) an average posttest score of 74% ± 0.1276 (p= 0.147).

| Discipline | Treatment A | Treatment B | Control | Total |
|---|---|---|---|---|
| **Animal Related Majors** | **15** | **14** | **16** | **45** |
| **Non-Animal Related Majors** | **6** | **9** | **7** | **22** |

Table 1. Comparison of animal-related majors (Animal Sciences, Zoology, and Wildlife) to non-animal related majors as indicated by the demographics survey.

| Demographic | Pre-existing Knowledge (Pre-test) |
|---|---|
| **Discipline** | 0.382 |
| **Agricultural Experience** | 0.427 |
| **Farm Residency** | 0.387 |
| **Cohabitation** | 0.000 |
| **Zoo Experience** | 0.208 |
| **Gender** | 0.259 |

Table 2. Correlations ($r^2$) of demographics and pre-existing knowledge (pre-test scores).

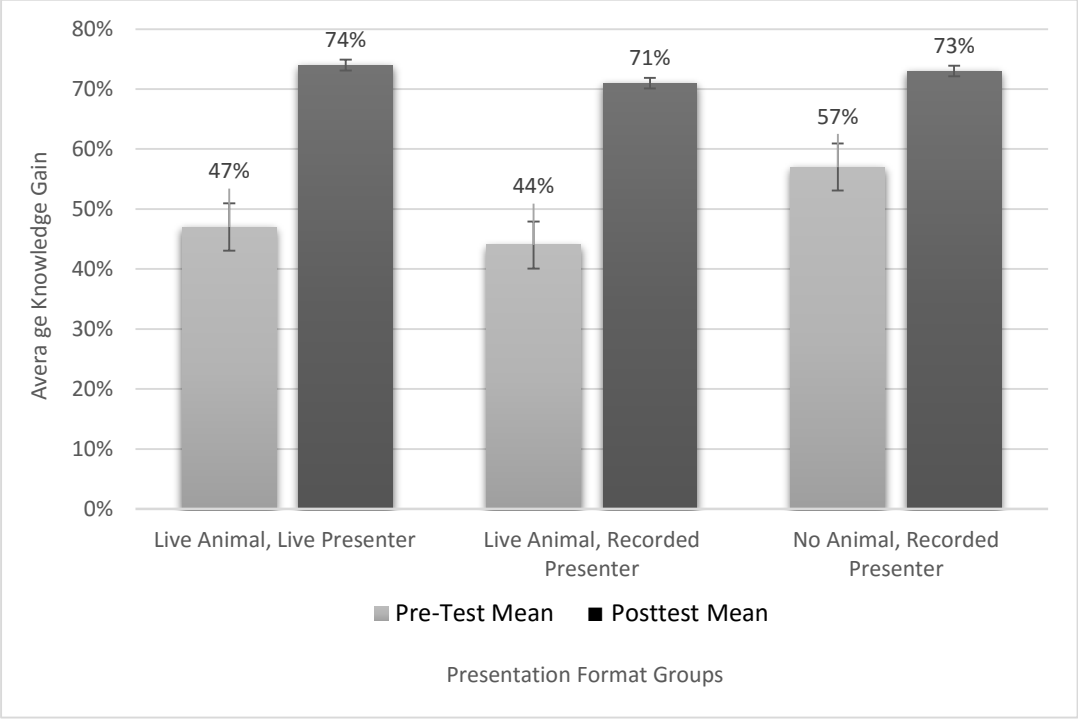


Figure 1. Average pre-test and post-test scores for all three treatment groups.

| Test | Discipline | n | Mean | Standard Deviation | P-Value |
|---|---|---|---|---|---|
| Pre-Test | Non- Animal Related | 11 | 41% | 0.1084 | 0.026 |
| | Animal Related | 23 | 52% | 0.1404 | 0.017 |
| Posttest | Non-Animal Related | 22 | 69% | 0.1189 | 0.154 |
| | Animal Related | 43 | 74% | 0.1276 | 0.147 |

Table 3. Effect of discipline on pre-existing student knowledge (pre-test score) and knowledge gained (post-test score).

**Discussion**

The results of this experiment support the hypothesis that the presence of a live animal in an educational setting increases knowledge gain. This finding supports other human-animal interaction hypotheses, that animals have a positive effect on humans (Serpell, 1996; McCardle et al., 2008). The knowledge gain shown in treatment A group and treatment B group, but not in the control group signifies that the animal presence is the key variable that effects the subjects' knowledge gain. Animals have been used for dissection and research within school systems for years (Cunningham, 2000). Oftentimes, this interaction promotes a positive correlation with knowledge gain. However, many also have a moral issue with the use of deceased animals being used within an educational setting. With the current study's discoveries, live animals would be beneficial if used within an educational setting, which

are results similar to those mentioned, and may be able to alleviate the moral issues that arise when using deceased animals.

This study also demonstrates that agricultural background and an animal-related discipline significantly influenced pre-existing knowledge (pre-test scores). Having an agricultural background is defined by demographics such as farm residency and FFA/4H membership. This has an influence on pre-existing knowledge, most likely due to the fact that the subjects are often around animals and interested in the subject matter (Lenning and Ebbers, 1999). Prior involvement in agricultural youth organizations was found to have a significant association with a student's academic performance as well as their knowledge retention (Ball, 2001). There was also an influence on pre-existing knowledge by the subject's academic discipline. Those with animal related majors (i.e. animal sciences, wildlife, and zoology) tended to have a higher pre-test score than those who were not an animal related discipline.

Additionally, having a live presentation versus a recorded presentation has little to no effect on knowledge gain. This data is supportive of a previous study identifying the practical use of presentation format (Moreno and Valdez, 2007). This study indicates that presentation format is not as important as further supplementation to help provide an experience and promote long term retention (2007). Providing a live animal presence within an educational setting would provide this supplementation and, as proven in the current study, would increase knowledge gain.

This study promotes practical implications for the educational community. With a live animal presence increasing knowledge gain, those who teach subjects such as animal physiology, reproduction, social structure, diet/nutrition, conservation, and terminology would be able to use a live animal to spark interest and ideally, improve knowledge gain and retention. As mentioned before, not only do human-animal interactions benefit humans, but they also greatly improve the lives of the animals involved (Rowen and Beck, 1994; Serpell, 1996; Hemsworth et al., 2000;

Esposito et al., 2011). Human-animal interactions may act as animal enrichment, improving their quality of life (Young, 2003). Enrichment is becoming a huge study throughout animal care facilities. Anything that can mentally stimulate an animal or provide a fresh experience is considered enrichment (Young, 2003). While providing the animal with an experience, such as presenting them to a class would be considered animal enrichment and would be proven beneficial.

These findings highlight the value of animals used in educational settings and demonstrate the need for further investigation of human-animal interactions in regards to educational goals and academic achievement. Providing more information on the topic and strong statistical data would give evidence of the need for an animal present within an educational setting. This current study provides the basis for implementation of these actions.

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